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ABSTRACT

Random samples of 1979 and 1980 entering freshmen were given the Non-Cognitive Questionnaire (NCQ), which was designed to assess noncognitive dimensions predicting minority student academic success. The validity of the NCQ in predicting graduation after five and six years was determined. The graduation rate was found to differ significantly for black and white students, with black students showing lower graduation rates. A trend was found with respect to black students taking slightly longer to graduate than whites. The relationship of each of the NCQ dimensions and the traditional predictors of SAT scores to graduation was examined separately for each year x race sample using step-wise discriminant analyses. SAT scores were not found to be related to graduation in any of the samples. The NCQ dimensions were found to be fairly predictive for both races, but especially for the black samples. The dimensions of academic self-confidence and community service were found predictive of graduation for both black and white students. In addition, expectations of difficulty due to racism, support for academic plans, perseverance, and academic motivation were found to be predictive of eventual graduation for black students. (Author)

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# PREDICTION OF COLLEGE GRADUATION USING NOCOGNITIVE VARIABLES BY RACE

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## SUMMARY

Random samples of 1979 and 1980 entering freshmen were given the Non-Cognitive Questionnaire (NCQ) which was designed to assess noncognitive dimensions predicting minority student academic success (Sedlacek & Brooks, 1976). The validity of the NCQ in predicting graduation after five and six years was determined. The graduation rate was found to differ significantly for black and white students, with black students showing lower graduation rates. A trend was found with respect to black students taking slightly longer to graduate than whites. The relationship of each of the NCQ dimensions and the traditional predictors of SAT scores to graduation was examined separately for each year x race sample using step-wise discriminant analyses. SAT scores were not found to be related to graduation in any of the samples. The NCQ dimensions were found to be fairly predictive for both races, but especially for the black samples. The dimensions of academic self-confidence and community service were found predictive of graduation for both black and white students. In addition, expectations of difficulty due to racism, support for academic plans, perseverence, and academic motivation were found to be predictive of eventual graduation for black students.



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Prediction of college graduation

using noncognitive variables by race

A persistent problem in higher education is the differential attrition rate among students of different racial/ethnic backgrounds. Of particular concern is the attrition rate of black students relative to whites. The rates of persistence are much lower for black students (Astin, 1975, 1978, 1982; Sedlacek & Pelham, 1976), especially for those black students enrolled in predominately white institutions (Goodrich, 1978; Sedlacek & Webster, 1978). These differences in persistence have not been found to be related to traditional ability measures (Astin, 1982; Tracey & Sedlacek, 1984, 1985). It has often been concluded that these differences are reflective of the different process involved in achieving academic success between majority and minority students. To succeed in predominately white institutions requires very different skills for black students than white students because the environment is not the same for each (Fleming, 1984; Loo & Rolison, 1986).

These conclusions have led researchers to examine the similarity of the academic success process between black and white students. There is some current debate on the validity of the conclusion that the educational attainment process is different for the different races. Some researchers have found evidence for the different patterns in educational success between black and



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white students (e.g., Portes & Wilson, 1976), while others have concluded that the process is similar (Gottfredson, 1981; Wolfle, 1985). However, this literature has tended to focus on educational attainment in general, not just higher education, and uses variables of a more demographic, sociological nature, e.g., parents' educational attainment.

In reaction to focusing on these demographic variables, or on traditional ability measures (e.g., SAT or ACT scores and high school grades), many practitioners and researchers are examining more individual, noncognitive variables that might be related to academic success in higher education. Increasingly, the relationship of noncognitive dimensions to academic success (both with respect to grade point average and persistence) has been substantiated in the literature (Arken, 1964; Astin, 1975; Beasley & Sease, 1974; Clark & Plotkin, 1964; Gelso & Rowell, 1967; Gibbs, 1973; Messick, 1979; Nelson, Scott, & Bryan, 1984; Pascarella & Chapman, 1983; Pascarella, Duby, & Iverson, 1983; Pruitt, 1973; Tinto, 1975).

Sedlacek and Brooks (1976) have hypothesized that noncognitive variables would be even more relevant for black students than whites. Specifically, they reviewed the literature and proposed seven dimensions that would be related to black student academic success in predominately white colleges. The seven dimensions are: (1) positive self-concept, (2) realistic self-appraisal, (3)



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understanding of and ability to deal with racism, (4) preference of long-range goals over more immediate, short-term needs, (5) availability of a strong support person, (6) successful leadership experience, and (7) demonstrated community service. Tracey and Sedlacek (1984, 1985) assessed the validity of each of these dimensions (as well as an eighth dimension called academic familiarity) with respect to both grades and persistence for both black and white students. They found strong support for the variables in predicting future grades for both races, but the strongest result was the relationship of these variables to persistence for black students. These variables were highly related to continuing enrollment for black students, while SAT scores were not. The noncognitive variables were also related to persistence for white students but to a lesser degree. Further, Tracey and Sedlacek found that different noncognitive dimensions more related to academic success for blacks at different points in their college careers. Early black student persistence was found to be related to having strong support for educational plans, and preference for long-range goals, as well as positive self-concept and realistic self-appraisal, which were also found to relate to persistence throughout the college years. Later persistence (after two and three years) was related to an ability to understand and deal with racism, and demonstrated community service.



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The purpose of this study was to examine the validity of these noncognitive dimensions for predicting college graduation. It is noteworthy that an increasing amount of the research concerning variables related to academic success in higher education has gone beyond first year performance (e.g., Farver, Sedlacek, & Brooks, 1975; Wilson, 1980, 1981, 1983); however studies actually examining graduation appear to be rare. Although all measures are used with the intent of decreasing attrition and increasing graduation, few studies examine the validity of measures with respect to this criterion. The present study was an attempt to validate the noncognitive dimensions with respect to graduation for both black and white students. Since many students do not graduate in four years, graduation after five and six years was examined.

## Method

### Sample and Procedures

All 1979 entering freshmen and a random sample (approximately 25%) of the 1980 entering freshmen who attended summer orientation at a large, predominately white, eastern state university were sampled. Those students who attended summer orientation typically represent 90% of the entering freshmen. These samples were administered the Non-Cognitive Questionnaire (NCQ). Only those students whose enrollment/graduation status as of July, 1985 was available from university records were selected for inclusion in



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this study. This resulted in 89% of the original sample being included here. The resulting samples were N=1262 (1137 whites and 125 blacks) for the 1979 entrants and N=504 (415 whites and 89 blacks) for the 1980 entrants.

The validity of the NCQ in predicting graduation status after six years for the 1979 entrants and after five years for the 1980 entrants was determined.

Instruments

Non-Cognitive Questionnaire (NCQ) was designed to assess the seven factors hypothesized by Sedlacek and Brooks (1976) to be related to minority student academic success, as well as the added dimension of general academic familiarity, which was defined as the extent to which a student's extracurricular activities and interests related to formal academic subjects. The seven non-cognitive dimensions were: (a) global positive self-concept as related to expectations for the coming years, (b) realistic self-appraisal, especially with respect to academic abilities, (c) an understanding of racism and an ability to deal with it, (d) an ability to work toward longer-term goals, rather than more immediate, short-term ones, (e) availability of people supportive of one's academic goals, (f) successful leadership experience in either organized or informal groups, and (g) demonstrated community service as indicated by involvement in local community



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and/or church activities during the years prior to college. The NCQ consists of 23 items, including two categorical items on educational aspirations, 18 Likert-type items on expectations regarding college and self-assessment, and three open-ended items requesting information on present goals, past accomplishments, and other activities. All items were found to have adequate test-retest reliabilities (two-week estimates ranging from .70 to .94 for each item with a median value of .85) (Tracey & Sedlacek, 1984).

The open-ended items were rated by two judges for the following variables (with interrater reliability estimates presented in parentheses): long range goals ($r$=.89), academic relatedness of goals ($r$=.83), degree of difficulty of the listed accomplishments ($r$=.88), overall number of outside activities ($r$=1.00), leadership ($r$=.89), academic relatedness of activities ($r$=.98), and community involvement ($r$=.94).

Tracey and Sedlacek (1984) found good support for the construct validity of the NCQ using factor analysis. Their factor analysis yielded eight factors which closely approximated the hypothesized dimensions. Based on these factor results, the NCQ items were summed to yield eight subscales. These subscales were here renamed to more accurately reflect their content. The eight subscales, with the internal consistency alphas estimated from the total sample employed in this study ($n$=1766) listed in



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parentheses, are: self-assessment of academic motivation (ACAMOT, alpha=.56), perseverance (PER, alpha=.82), leadership (LEAD, alpha=.66), academic self-concept (ACASC, alpha=.55), long-range academic goals (LRG, alpha=.58), community service COMM, alpha=.39), support for academic plans (SUPP, alpha=.57), and expected difficulty (DIFF). This last subscale was found to differ between black and white students. For white students this subscale loaded on items relating to expected difficulty in adapting and doing well in college. It tended to show a pessimistic set of expectations. For the black samples, the same items loaded on this factor but items relating to expecting to experience racism also loaded. So for blacks, the item tended to reflect poor expectations which are attributed to racism. For the white sample the expected difficulty subscale (DIFF) was found to have an alpha of .45, while for the black sample, this renamed expected racial difficulty subscale (RACDIFF) was found to have an alpha of .55. Overall, the listed alphas were felt to be reasonable considering that the subscales were from two to four items in length.

## Results

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The graduation rates of each of the four year x race samples are presented in Table 1 as well as the results of a $z$ test of the difference in the graduation rates between blacks and whites in the same entrant year. In both years, black students had a significantly lower rate of graduation. Also, the graduation rates within race, across year were found to differ significantly. White students in the 1979 sample had a higher graduation rate than white students in the 1980 sample ($z$= 2.22). The same result was found for the black student samples ($z$=4.67). These differences across sample year could be attributable to sample characteristics, but more probably they may be due to the inclusion of an added year. The graduation rates increase with added time. This was especially true for the black subsamples. The black student graduation rate seems to be related to the length of time used to assess graduation. Black students appear to take longer to complete college.

To examine this longer time hypothesis, the number of students still enrolled, but not graduated after five and six years, was tabulated and presented in Table 1. Significantly more black students in the 1980 sample were still enrolled and working toward graduation than in the white sample, although the absolute number is still low.

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Insert Table 2 About Here

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To examine which NCQ subscales were related to graduation, separate step-wise discriminant analyses (those subscales that did not significantly add to prediction were excluded) were conducted on each of the four year x race samples. The results of these analyses are summarized in Table 2. In none of the analyses did the SAT scores yield significant prediction of graduation, so only the NCQ subscales that significantly added to prediction are listed. As can be seen, for each of the black samples, there was a higher prediction of graduation found than for the white samples. Also, many more of the NCQ subscales were found to be related to graduation for black students than for white students. Given the greater difficulty in finding significant predictors in smaller samples than in larger samples, these results are likely stronger than they appear. All the subscales that entered the equations loaded in a manner similar to the univariate relationships; thus any results due to suppressor effects can be ruled out.

For the black samples, the most predictive subscales were the self-assessed academic motivation (ACAMOT), perseverence (PER), having strong support for college plans (SUPP), and demonstrated community service (COMM). Academic self-confidence (ACASC) and expectations of difficulty due to racism (RACDIFF) were related to graduation in only one of the two black samples. For the white



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students, only academic self-confidence and expected difficulty were related to graduation. Demonstrated community service was related to graduation only for one of the white samples.

## Discussion

The results of this study indicate that student attitudes and expectations at matriculation are related to graduation five and six years later. The noncognitive dimensions assessed by the NCQ were found to significantly related to graduation while the traditional measures of academic ability (i.e., SAT) scores were not. The failure of SAT scores to predict graduation could be attributed to a restriction of range at initial matriculation. Assuming homoscedasticity, not admitting students based in part on SAT scores would restrict the range of scores and thus lower any correlations. However, in the university where this study was conducted, 90% of all in-state applicants are accepted. In-state students make up roughly 85% of the student population at any time. So, the restriction of range was not great. Another interpretation of the failure of SAT scores to be related to graduation is that ability is not necessarily related to graduation. To graduate, students are required to apply themselves and work fairly diligently over an extended time period. It would be expected that a variety of other dimensions would perhaps be better related to graduation, e.g., noncognitive



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dimensions.

Some of these noncognitive dimensions were assesed by the Non-Cognitive Questionnaire and were found to be related to graduation. These results were true for white students but especially for black students. These results, together with those of Tracey and Sedlacek (1984, 1985), indicate that black students expectations upon entry are fairly predictive of future academic success, even up to six years later. This result is even more surprising given that there was a restriction of range found in the noncognitive items due to the loss of student data over the six years of this study. The standard deviations of the NCQ items from the orignial sample were higher than were those of samples where complete SAT and university records were obtained (i.e., the samples examined in Tracey and Sedlacek (1984, 1985 and here). The attrition of students from the study was related to a reduction of variance in the dimensions of interest. Thus, the presence of these significant NCQ-graduation results is important and counter to what would be expected if the results were statistical artifacts.

It is interesting to note the results that seem to imply that black students may take longer to graduate than white students. This result is not surprising if one views the experience of being a student in a predominately white institution as being quite different for black and white students. Black students have a

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different environment to respond to (assumed to be a more hostile, foreign one), and thus more energy could be devoted to meeting these extra challenges. Perhaps wise planning dictates that the process takes longer. If this pattern of black students taking longer is true, there are some clear implications regarding research and practice. First, measures of educational attainment using years of schooling would not be equivalent across race. More importantly, most colleges and universities are set up to promote movement through school in four years. If black students take longer, they will more likely feel isolated and persevering may be even more difficult. Perhaps accommodations to altered styles are required. Planning programs and services for one group at the expense of another is an example of institutional racism. These are some interesting implications of the result that black students may take longer to graduate. However, these results have limited generalizability (low n and conducted only at one school), so they are only preliminary.

The main result of this study is the predictive validity of the NCQ with respect to graduation. Given this, the NCQ could be used to assess students at initial matriculation and those students who may be most likely to have difficulty could be identified. Specific preventative programs could then be established to increase the likelihood of academic success. However, caution must be taken with respect to the possibility of stereotyping

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students. Students change greatly over their undergraduate years and need to be allowed to express their development in a variety of ways. These dimensions are only cues to possible difficulties, not a diagnosis.

There are many possible uses of the NCQ, but more research is needed. It could be a useful addition to our selection materials, but first it must be validated in this regard. The response set of applicants may be very different from the response set of already matriculated students. The instrument also needs to be further developed and perhaps increased in length to yield subscales with stronger psychometric support. Of course, to enhance generalizability, it should be validated at other institutions and with other racial groups. Studies of this nature are currently underway.

Finally, given the sex x race differences in degree attainment found by Trent (1984), it may be beneficial to also examine the validity of the NCQ separately for males and females. However, the results of this study and those of previous studies (Tracey & Sedlacek, 1984, 1985) support the worth of the NCQ in predicting and understanding academic success, especially for black students.



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Table 1

Graduation and Enrollment Rates of each Sample as of July, 1985

| Sample | N | Graduated n | Graduated % | Not Graduated n | Not Graduated % | z |
|---|---|---|---|---|---|---|
| 1979 White | 1137 | 778 | 68 | 359 | 32 | 2.93* |
| 1979 Black | 125 | 69 | 55 | 56 | 45 | |
| 1980 White | 415 | 257 | 62 | 158 | 38 | 6.71* |
| 1980 Black | 89 | 20 | 23 | 69 | 77 | |

| | | Enrolled n | Enrolled % | Not Enrolled n | Not Enrolled % | z |
|---|---|---|---|---|---|---|
| 1979 White | 1137 | 50 | 04 | 1087 | 96 | .52 |
| 1979 Black | 125 | 6 | 05 | 119 | 95 | |
| 1980 White | 415 | 30 | 07 | 385 | 93 | 2.17* |
| 1980 Black | 89 | 12 | 12 | 77 | 88 | |

*$p < .05$



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Table 2

Summary of the Discriminant Analyses Using Graduation as the Criterion.

| Sample | N[1] | Canonical R | Variables Entered | Standardized Beta Weights |
|---|---|---|---|---|
| 1979 White | 1038 | .22 | ACASC | .75 |
| | | | DIFF | -.32 |
| | | | COMM | .32 |
| 1979 Black | 106 | .44 | PER | .74 |
| | | | ACAMOT | .57 |
| | | | COMM | .53 |
| | | | RACDIFF | -.38 |
| | | | SUPP | .21 |
| 1980 White | 377 | .28 | ACASC | .93 |
| | | | DIFF | -.34 |
| 1980 Black | 68 | .38 | ACASC | .68 |
| | | | ACAMOT | .55 |
| | | | PER | .43 |
| | | | COMM | .33 |
| | | | SUPP | .27 |

[1] These N's include only those students from whom complete NCQ data were available.

Prediction of College Graduation

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